NL

LCD MONITOR

SCREEN FORMAT

INCLUDES LAST IMAGE HOLD

Release 2 May 2007

User/Service Manual

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Releases history

Rev.	Date	Page/s	Modification description	.Signature
Draft	March 2006		First emission not released	
0	May 2006	24	Document approval	
1	March 2007	28	Added POWER SUPPLY and version at 20”	
2	May 2007	28	Added video standard in one model only	
3				
4				

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This manual in English is the original version.

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1 INTRODUCTION

NOTE:
The present manual is updated for the product it is sold with in order to grant an adequate reference in performing diagnostics and repair operations normally carried out by the service engineer.
The manual may not reflect changes to the product not impacting service operations.

NL is a high performance LCD monitor developed to offer a superb quality radiological image display.

The purpose of this manual is to give to the service engineer instructions for a safe and efficient service and maintenance of NL LCD monitor.

The device must be serviced and maintained in compliance with the procedures described in this manual and never used for purposes different than the ones described in this manual.

Users are answerable for legal fulfillment of the installation and functioning of the device.

1.1 Icon appearing in the manual

This icon indicates a NOTE: please read thoroughly the items marked by this picture.

This icon indicates a WARNING message; the items marked by this icon refer to the safety aspects of the patient and/or of the operator.

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2 SAFETY ASPECT

WARNING: Please read this chapter thoroughly.

NICAL devices comply with the related safety requirements; furthermore it supplies all information necessary for a correct use and the warnings related to danger associated with x-ray generating units.

NICAL, can not be held responsible for:

- use of NL different from the intended one as described in this manual;
- damages to the device, to the operator, to the patient, caused either by wrong installation or maintenance procedures, different from those described in this manual and in the user manual supplied with the unit, and by wrong operations;
- mechanical and/or electrical modifications performed during and after the installation, different from those described in the manual.

Any technical intervention must be performed by NICAL qualified technicians.

Only authorized personnel can remove the covers and/or have access to the components under voltage.

2.1 Warning

The NL series monitor must be connected to an EN/IEC 60601-1-1 approved power supplier which must be connected to ground.

This device has not been designed to be used in environments where vapors, anesthetic mixes flammable with air, or oxygen and nitrous oxide can be detected.

Avoid pouring water, even accidentally, or other liquids into the device, as this could cause short-circuits.

Before cleaning the device, please disconnect it from the line voltage.

Though this product has been designed with a quite acceptable protection level from electromagnetic interference, it is advisable to install it at a certain distance from electrical energy transformation rooms, from static continuity units, from portable receiving-transmitting units for

amateur use and for cellular use. Cellular telephones are only admitted at a distance of more than 1, 5 m from any component of the device.
Other medical instruments and devices that must be used in the same installation area of the unit must comply with the Electromagnetic Compatibility rules in force. Non-complying instruments, of which the poor protection from electromagnetic fields is well known, must be installed at least 3 mt away from the NL monitor and supplied by a different electrical line.

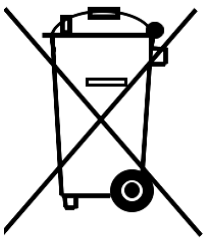
The equipment automatically performs some self-test functions and therefore is able to detect some anomalous conditions. However, whenever there are doubts on the performance of the equipment (e.g. images too clear, too dark or with artifacts), the activity must be suspended and a NICAL qualified and authorized engineer must be contacted.

During the use of the equipment, the operator must comply with the local work safety regulation, in particular with the ones referring to the use of video terminals.

2.2 Environmental risks and displacement

The NL monitor contains in some of its parts, materials that at the end of the units life, must be recycled at an approved location.
Particularly the device contains the following materials and/or components:

- iron, copper, aluminum, non-biodegradable plastic material, glass-resin for printed circuit board (PCB).



Correct disposal of this product
(Waste Electrical & Electronic Equipment)
(Applicable in the European Union and others European countries with separate collection systems)

This marking shown on the product or its literature, indicates that it should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial wastes for disposal.

2.3 Symbols used

Symbol	Description
	Warning, read the relevant documentation
	Direct current
	Complies with Medical Equipment Directive 93/42
	Device with type B applied parts
	Correct disposal of this product (Waste Electrical & Electronic Equipment)

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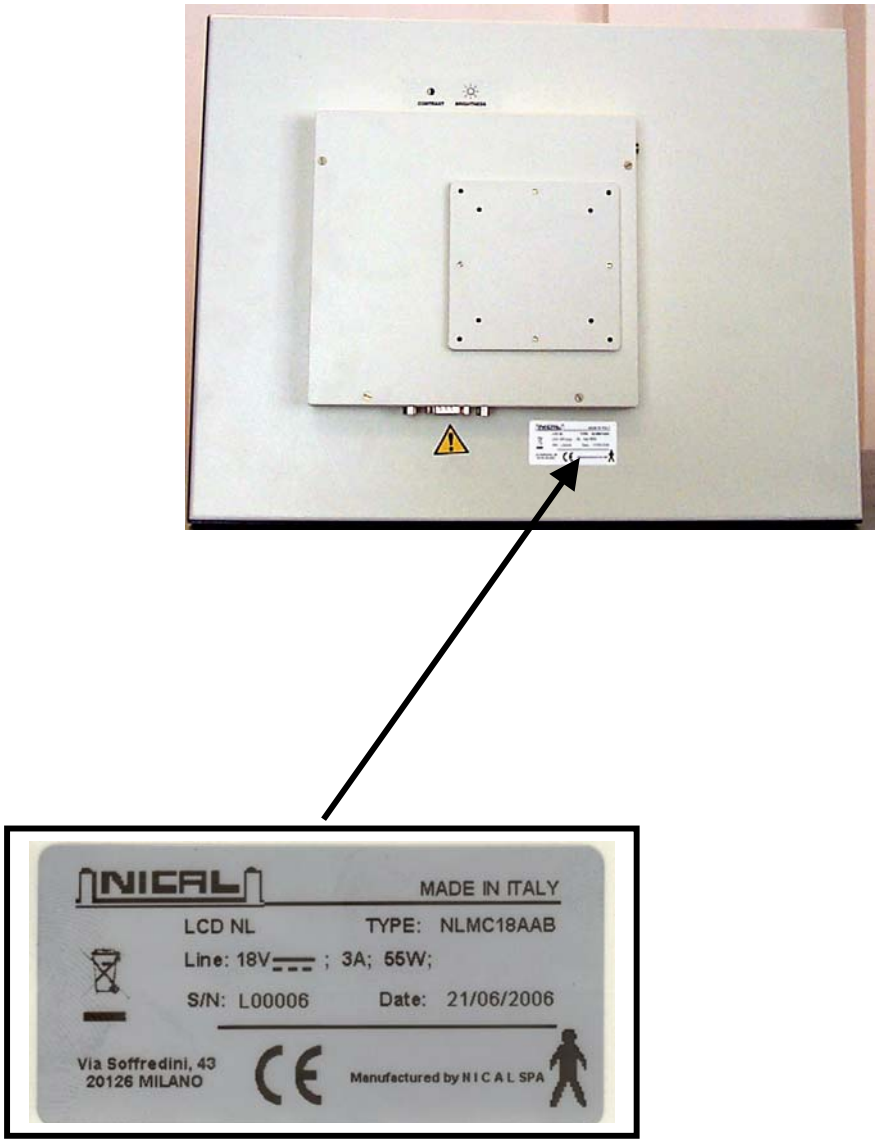
3 DESCRIPTION

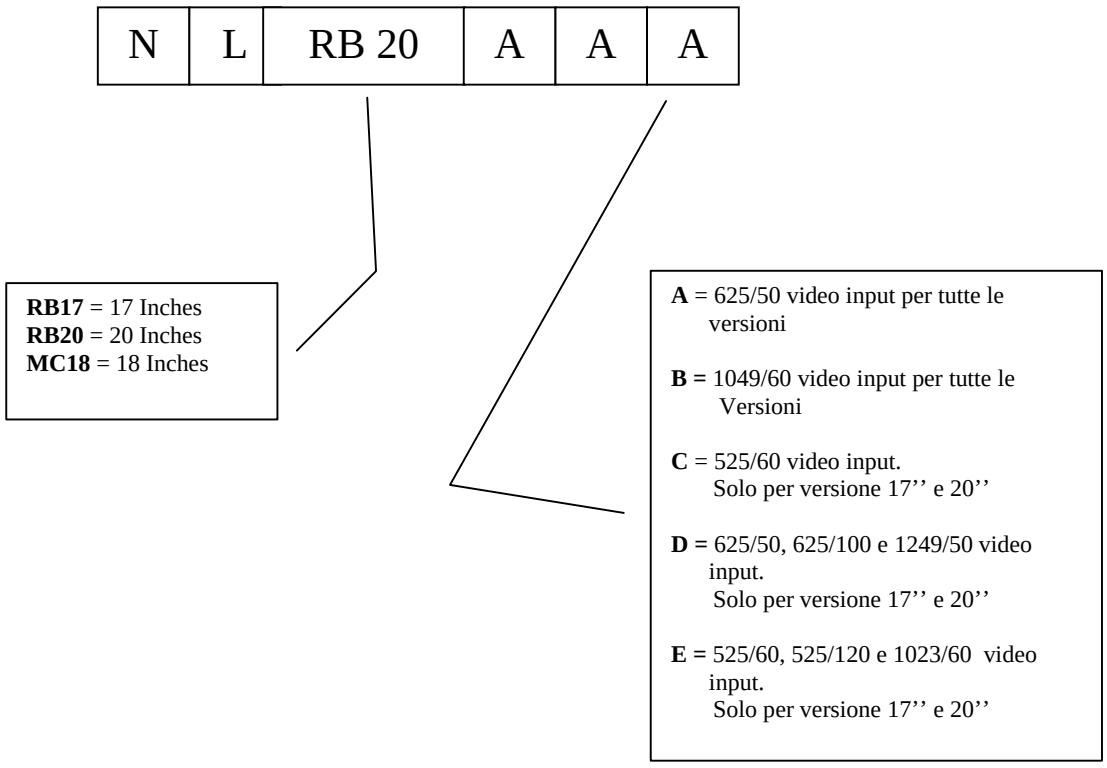
3.1 Identification labels



3.2 Description

NL is an LCD monitor which is used in radiological application for its excellent brightness and an optimum contrast ratio and for its visibility angle which corresponds to 180° in vertical and horizontal viewing.
All NL LCD monitors are provided with a VESA interface where it is possible to mount any kind of support by the customer.

NL monitor is available in different versions with a specific code like the following explanation:


N
L
RB 20
A
A
A
RB17 = 17 Inches
RB20 = 20 Inches
MC18 = 18 Inches
A = 625/50 video input per tutte le versioni
B = 1049/60 video input per tutte le Versioni
C = 525/60 video input. Solo per versione 17'' e 20''
D = 625/50, 625/100 e 1249/50 video input. Solo per versione 17'' e 20''
E = 525/60, 525/120 e 1023/60 video input. Solo per versione 17'' e 20''

4 TECHNICAL DATA

NOTE:
Technical data, performance and instructions provided in this manual are referred to the NLRB20AAB model. Therefore, some of these characteristics are not applicable for systems with fewer features.

4.1 LCD Monitor Features

Technical data			
Type		Monitor LCD	
Manufacturer		NICAL	
Model		Refer to optional	
Hardware requirements			
Mounting interface		VESA compatible 100x100 mm centered mounting pad	
Power supply location		Internal power supply	
Video connector		Double BNC video connector	
Brightness and contrast controls		Dedicated knob or remote regulation	
Case color		White RAL 9001	
Frame color		Anthracite RAL 7016	
Dimensions and weight	**Monitor 17”**	**Monitor 18”**	**Monitor 20”**
Weight	4 Kg	5 Kg	6,5 Kg
Height	302 mm	329 mm	343 mm
Depth	60 mm	74 mm	77 mm
Width	367 mm	401 mm	444 mm
Screen dimensions	17”	18”	20”
Electrical characteristics for all models			
Standard power supply		18 Vdc ±10%	
Current absorbed		3 A	
Power absorbed		55 W	

Display characteristic	Monitor 17”	Monitor 18”	Monitor 20”
Visibility angle	180°	180°	180°
Contrast	1000:1	1000:1	1000:1
Resolution	1280x1024	1280x1024	1600x1200
Pixel pitch	0,264x0,264 mm	0,2805x0,2805 mm	0,255x0,255 mm
Gray scale	768 levels	768 levels	768 levels
Max luminance	350 Cd/m^2	900 Cd/m^2	450 Cd/m^2
Calibration	automatic	automatic	automatic
Aspect ratio	4:3	4:3	4:3
Response time	Total response time less than 25 ms	Total response time less than 25 ms	Total response time less than 25 ms
A/D Sampling	10 bit	10 bit	10 bit
Screen surface	Anti veiling glare/reflection with no speckle noise	Anti veiling glare/reflection with no speckle noise	Anti veiling glare/reflection with no speckle noise
Storage memory	Last image hold input connection	Last image hold input connection	Last image hold input connection
Video input	2 BNC connectors 75 Ohm	2 BNC connectors 75 Ohm	2 BNC connectors 75 Ohm
Video signal	1Vpp negative sync.	1Vpp negative sync.	1Vpp negative sync.
Standard Video	CCIR 625/50Hz	CCIR 625/50Hz 1049/60	CCIR 625/50Hz
	EIA 525/60		EIA 525/60
	1049/60		1049/60
	625/100Hz		625/100Hz
	1023/60		1023/60
	525/120		525/120

4.2 Environment and Reliability

Operative	Temperature: from 0° to +40° Celsius Humidity: 10% to 80 % (non condensing) Altitude: until 10.000 ft (3.000 mt)
Transport and storage	Temperature: from -20° to +60° Celsius Humidity: 5% to 85 % (non condensing) Altitude: until 15.000 ft (4.500 mt)
MTBF	50.000 hours at 25°C and 200 Cd/m^2

4.3 Standards

NL LCD monitor with accessories and optional complying with the relevant standards:

EN 60601-1	Electro medical equipment. General safety requirement (included amendment A1+A2+A11+A12+A13)
EN 60601-1-2	Electro medical equipment. General safety requirement. 2 – Collateral standards: Electromagnetic compatibility.
FCC Part 15 rules	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) and Subpart B (Unintentional Radiators) of the Federal Communication Commission (FCC)
EN 60950	Information device safety
CE	The symbol CE grants that NL LCD monitor complies with directives 93/42 by the European Community.

Further information regarding standards complying can be requested to:

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Email address : nical@nical.com

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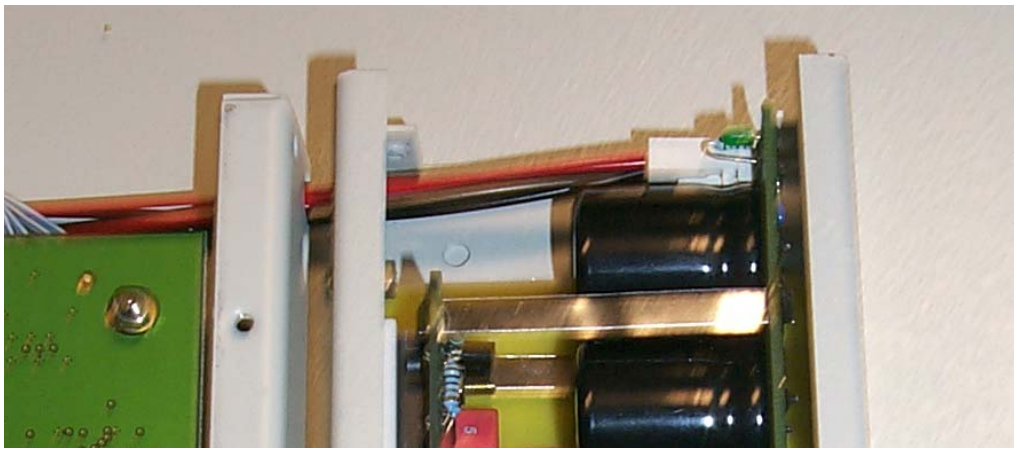
5 CONFIGURATION

NOTE:
The accessories sent with NL LCD monitor is the BNC 75 Ohm termination connector and the power supply cable only;

5.1.1 POWER SUPPLY

The NL LCD can be connected with the standard LCD power supply NLPWRLCD1 using the appropriated connector which can be found in every LCD monitor.

The following pictures show the details:



The features and the label description of this LCD power supply can be found in the following description.

Technical data	
Type	LCD power supply
Manufacturer	NICAL
Model	Refer to code
Hardware requirements	
Case color	White RAL 9001
Dimensions and weight	
Weight	1,5 Kg
Height	34 mm
Depth	202 mm
Width	72 mm
Electrical characteristics for all models	
Standard power supply input	115-230Vac ±10%; 50/60Hz; 110VA
Power supply output	18Vdc; 1-3A

5.1.2 NLPWRLCD1 Environment and Reliability

Operative	Temperature: from -10° to +40° Celsius Humidity: 10% to 80 % (non condensing) Altitude: until 20.000 ft
Transport and storage	Temperature: from -30° to +60° Celsius Humidity: 5% to 85 % (non condensing) Altitude: until 20.000 ft

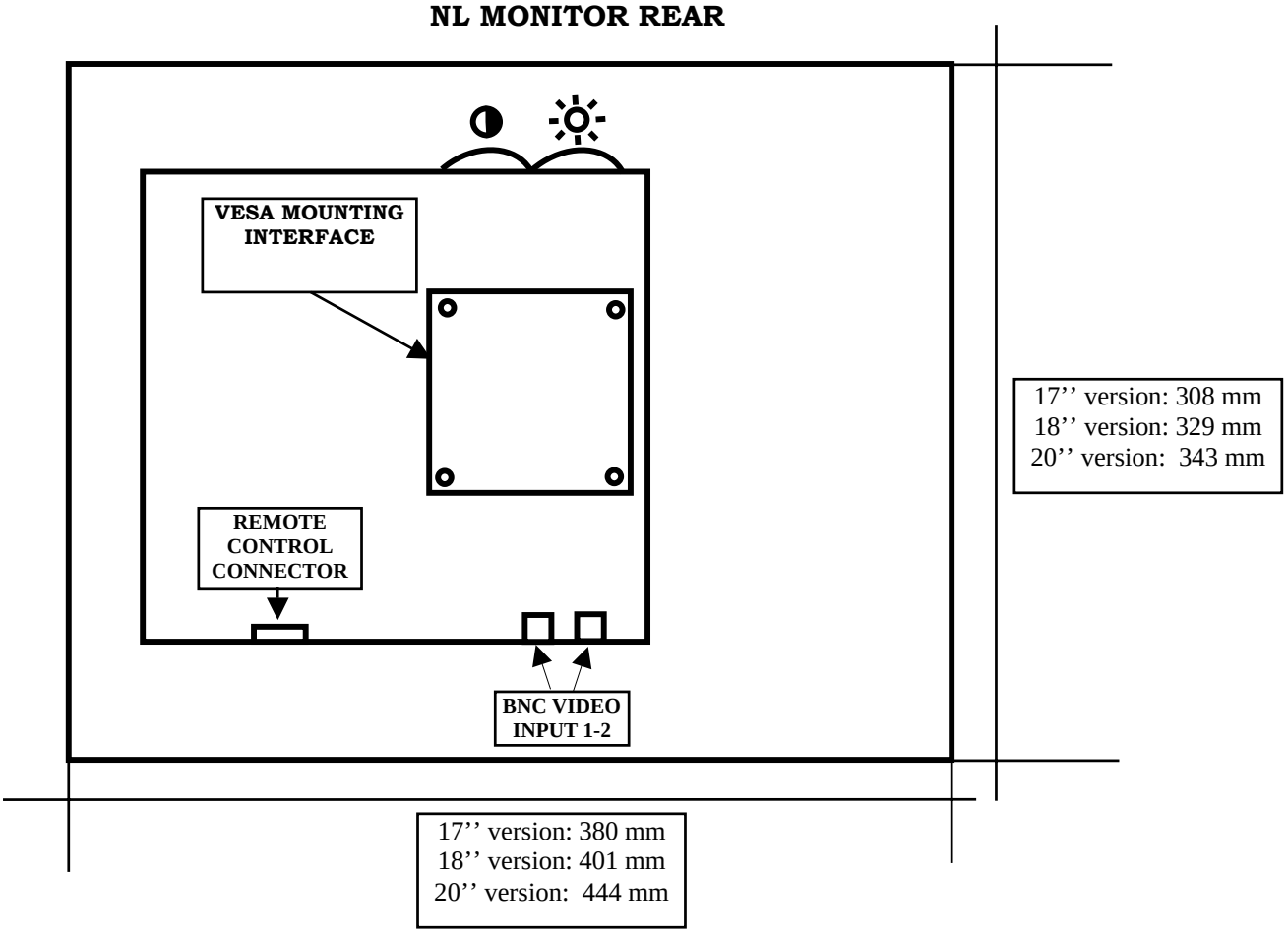
5.1.3 NLPWRLCD1 Standards

NLPWRLCD1 power supply complying with the relevant standards:

EN 60601-1	Electro medical equipment. General safety requirement (included amendment A1+A2+A11+A12+A13)
EN 60601-1-2	Electro medical equipment. General safety requirement. 2 – Collateral standards: Electromagnetic compatibility.
EN 60950	Information device safety
CE	The symbol CE grants that NL LCD monitor complies with directives 93/42 by the European Community.

5.2 Monitor interface

As shown in the next picture, the NL monitor can be found in the following configuration:

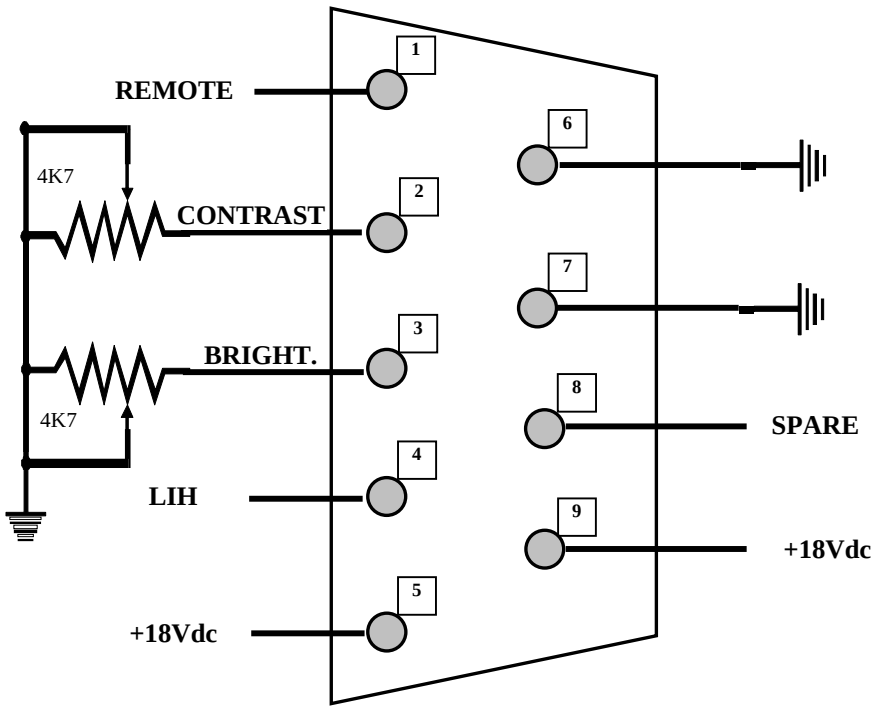


WARNING:
In order to fix the LCD monitor to any kind of stands use the appropriate screws with maximum depth 7 mm;

5.3 Remote control connector

In the NL monitor there is the possibility to have a remote control of contrast and brightness and also the possibility to have a last image hold of the image (LIH). These features are available using the 9 pin connector which can be found in the back side near the BNC video inputs.

A drawing of this connector is shown in the following pictures:



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6 MAINTENANCE AND CLEANING

Like all electrical device, this equipment requires periodical checks.
This will insure an efficient and correct functioning for years to come.

This equipment is made up of electrical and electronic parts that need to be checked out in order to guarantee high quality radiological results as described in previous chapter.

WARNING:

- Before proceeding with the cleaning of the equipment, disconnect it from the mains
- Make sure that water and any other liquids are not spilled inside the equipment as this may cause corrosion and short circuits
- Clean the painted surfaces by using a moist cloth and neutral detergent, taking care to wipe them by using a dry cloth. Do not use solvents (alcohol, petrol, and trichloroethylene) or corrosive or abrasive products.

6.1 Frequency of maintenance and cleaning actions

Frequency	**Description**
6 months	Cleaning the internal parts of the main rack
6 months	Checking of the image quality.
6 months	Checking of the proper functionality of the equipment as described in the manual.
1 year	Visual checking of the status of the interconnection cables and relevant connection.
2 years	Cleaning of printed circuits board located inside the central rack and the monitors.

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7 SCHEMATICS AND DRAWINGS

1. LCD-PWV (LCD POWER SUPPLY)
2. LCD-PWV (TOPOGRAPHIC LCD POWER SUPPLY)

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